Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- A. M. Kennedy Books
Notebook, N-15-09-17

This notebook is a continuation of N-15-08-02.2. It was used by Absalom M. Kennedy during September-October 1915 as a daily record of experiments and tests with phonograph recorders and reproducer parts. The daily record is continued in N-15-10-21. The tests involve various recording machine parts and instruments, as well as variations in the positions of voices, instruments, recording horns, and cow-hair reflecting screens. Some of the tests relate to cylinder recorders. Kennedy's notes also describe other projects, such as his work for Miller Reese Hutchison on a wireless telephone system and the preparation of a two-minute recording of Hutchison for the Panama Pacific International Exposition in San Francisco. There are also references to setting up experiments at the Brooklyn Navy Yard in connection with Edison's work on the Naval Consulting Board. Other individuals involved in the phonograph experiments include E. Rowland Dawson, Clarence B. Hayes, William F. Nehr, R. H. Simpson, and George J. Werner. Some of the work was done on orders from Hutchison or Charles Edison. Other experiments were based on Edison's direct instructions and used recording horns designed by him. Two pages of comments and instructions by Edison have been inserted into the book. The front cover is labeled "Recording Experiments Book #5 From Sept. 17, 1915 To Oct 21, 1915." The pages are unnumbered, and several pages have been removed from the book. Approximately 110 pages have been used.

Sept. 17, 1915.

With Taylor finishing up model for casting for goose neck for Amberola 30 machine to adapt for D.C.S. Recording.

Made up Shellac with castor oil to prevent getting brittle and chipping. When the shellack and oil (small amounts) is dissolved in wood alcohol and allowed to evaporate this seems successful. When the shellac and oil are heated together however, the mixture remains somewhat brittle and its strength as compared with pure shellac is impaired.

Made up powder # 55

9/17/15 - Piano. Weak. Back in horn. Tuner sharp - "High notes lack tone"
Voice - Weaker, sharper, further back in horn but no response to EP

9/17/15

#55 - 4 minute recorder.

Brass head. Domed top. Knife edge pattern - 1 1/4" diam.

Diaphragm of Japanese paper - 2 coats shellac. On each side is shellacked 2 discs of mica, next to diaphragm .002" x 19/16". and over it .002" x 1". Coat of shellac given discs and diaphragm.

Tapered aluminum arm and regular .008" sapphire.

9/17/15.

Miss Damgrund came in afternoon. Testing recording piano as follows:

Piano

#55 - Weak - back in horn - little sharp tone holds fair "High notes lack tone"

#58 - Bigger & fuller & more natural - holds as well as 55. "Deeper Tone quality"

Voice

#58 - Natural - full - slight piano interference. Deep tone quality - diction not clear"

#55 Weaker - sharper - further back in horn. Responds to high notes. Only fair on low notes. "Back in horn"

Piano Experimental Recording

#58 & Long Horn #2 - Small - weak plunky.

#58 & Long Horn #1 - Bigger than ~~Long~~ but no ring. Extraneous rattle.

9/17/15.

#58 x 2#7 Horns – No ring. Dead. Sounds like "wood".

#58 x both long horns – Baritone goes to pieces but little more life than above.

Listened to Rigoletto Quartette. Record at night to compare with past =

#68 – not as big or full or loud or natural tone as 58 but has better definition. Clear & clean.

Criticism of Balance:

Piano too loud at first. Use sevens.

Baritone too loud. Also tenor on quartet parts. Bring Sop. parts closer to horns.

Victor Record of this. Tenor phrases part. Accent triplets in accompanyment. Soprano holds to accent grief. Separate voices stand out and express separate emotions. Note holds in time to accent.

9/18/15.

Worked on shellac with oil to make more flexible. When oil is mixed with alcohol and shellac then dissolved - this effect seems to take place.

When shellac is heated and oil mixed in later the resultant mass is still brittle and has less strength than the original shellac.

Mounted needles in arms.

9/20/15

Wrote up report.

Got ready for Diamond Disc Demonstrators. Machines - Note Books - Catalogues etc - and saw them started off.

Tested out pearders for Quartette this afternoon

Got out small screens to put between singers to help hold down interference These are made of asbestos about 1/8" thick, 2'x2' and hung between the horns.

Quartette came in afternoon. With Miss Reusen tried out pair of these "blinders" on solo -

#69 - With blinders, fuller & little further back in horn than without less tendency to blast.

Tried out #54 - good. also 69 & 57. Last was the cleanest of the lot.
#57 without blenders was sharper and did not hold so well.
#58 with blenders stands out better and about same fulness as without.
Mr. Boyle - Tenor -
R52 - Blenders - Clear & distinct

Invitible.
#52 - Clear - Clean - Sharp.
#54 - Fuller & more natural
#69 - Fullest & most natural.
#68 - Further back in horn
Clean. No tendency to blast
#58 - Natural - big - full but not so good enunciation -
Trio.
#51 - Weak - back in horn.
#58 - Stands out - full - big - louder.

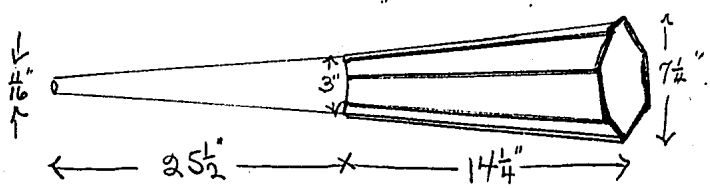
Mr. Boyle has good tenor voice which blends well with

the others. Did not know Quartette from Rigoletto or Pio from Faust cuts but learns quickly.

Further study of records made with blinders as compared with those made without at night seems to show that these blinders simply confine each voice to its own horn so that horns do not pick up side sounds & interferences. In this way apparently can work closer without blast.

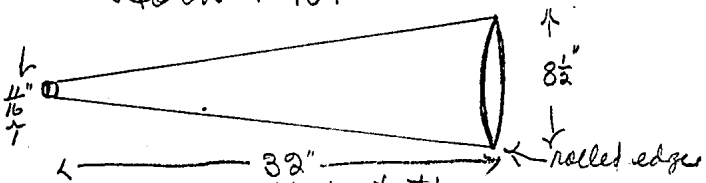
The records sound "little more horny & not as clear & brilliant as without blinders & do not sound as loud but on listening from distance they are as loud and clearer.

Horn #1.



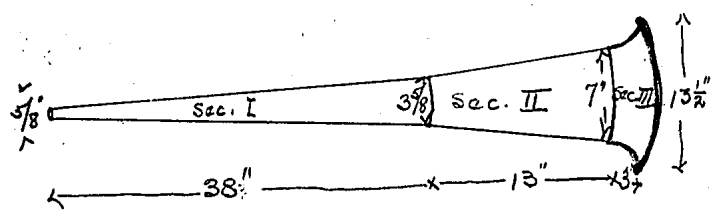
Small part of .017 zinc. Large part of .014" zinc. 7 sided edges rolled about 1/8" high. Mouth rolled about 1/8" diameter

Horn #2.



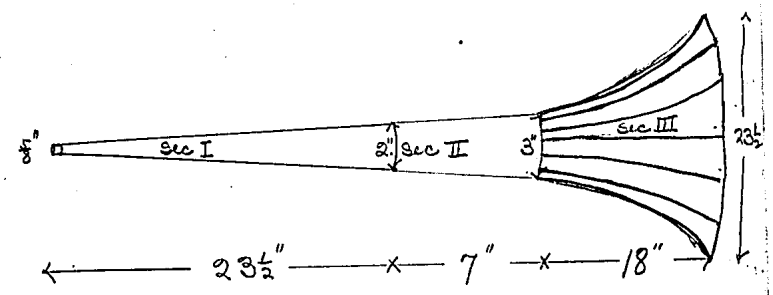
Made of .018" sheet tin black enamelled.
Marked "Accepted Standard amplifying Horn for Talking Machines".

Horn # 8.



Section I · Copper .008"
Section II · Sheet Tin .018" Black japanned.
Section III · Brass .0205" Rolled edge
Sections II & III from horn marked
"Accepted Standard Amplifying Horn.
for Talking Machines."

Horn #5.



Section I Sheet Tin .020"
Section II & III from 12 section Triumph Horn

9/21/15

Made up recorders #'s 69 & 44 and tested out.
With Mr. Dawson tested out #69 Recorder - open - with hard rubber and with asbestos blinders.
With Dawson
#69 - open - used as standard.
#69 with rubber blinders. Bigger, fuller & more natural both with voice and piano.
#69 with asbestos blinders - bigger & fuller than open but more muffled than with rubber blinders.
With Hayes:
#69 - open - used as standard.
#69 - with rubber blinders. fuller and more natural and true.
#69 - with asbestos blinds. fuller but dead.
Tested out following recorders to find poor ones to tear up and make over:

#58 Used as standard. Fuel, natural but poor surface. Hold

#55 - Sharper, back in horn, fringes, choked and muffled. Tear up.

#69 - Fuel - clean - holds well - natural - Hold.

#50 - Weak - back in horn - holds but thin - Tear up

#67 - Weak - muffled - back in horn - slight fringes Tear up

#59 - Fuel & true but back in horn - natural. Tear up

#51 - Little louder than 59 - natural - fair - hold

#42 - Holds well. Loud. Clean. Stands out. Hold

#44 - Does not hold - least - stands out Tear up

#58 - Retested for surface. Surface poor. But warmer & improved a little but not good yet.

Miss Imgrund came in afternoon.
Made tests to confirm use of blinders:

#52 Without Blinders
Mixed - Clear - light weak - natural. Mr. D. Clear.

#52. With Blinders. Louder - Fuller - Fuller - more natural both on. Miss L. & Dawson.

#58 - Without blinders. Weak - Back in horn -
With Blinders - Louder & much more natural

#67 - With blinders - louder & fuller than without and stops tendency to blast and holds down spots in voices.

The use of blinders makes the record fuller - louder - little further back in horn and seems to cover dull or voice change or other defective spots in the voices

Recorder #1

Recorder #2 - 4 min.

Outside Diameter Head	1 3/8"
Diameter Diaphragm	15/16"
Thickness Diaphragm	.002"
Material "	Mica.
Internal Diameter mica "	3/4"
Diameter Aluminum Disc	15/16"
Thickness " "	.004"

Arm Special T section of aluminum

Arm Waxed to aluminum & edge of mica.

#50 - Loud - natural - Haldo mill - Tuller than 58. Sharper than 67.

9/21/15

#50 - 4 minute Recorder

Brass head. 1¼" diam. Knife Edge pattern.

Jap. Paper Diaphragm. 1 Coat shellac each inside and out. Disc of mica 1 9/16" x .0025" shellacked to outside. Coat shellac over diaphragm and disc.

Regular aluminum arm and .008" sapphire.

9/21/15.

Loud - full - true - Compares well with #52 but not quite so sharp. Hold for further tests.

"Little fuller & barrely. Piano good and full".

(Miss D) As compared with #52 - "Smoother - fuller - better surface".

9/21/15

67 - 4 minute Recorder.

Brass Head - Knife Edge Pattern - 1 1/4" diameter.

Diaphragm of Japanese paper .001" thick. Given coat shellac on each side. Mica Disc .003" x 1 3/16" shellacked to outside. Coat Shellac over disc and diaphragm.

Regular Aluminum arm and .008" sapphire.

#44 Does not hold well — fringes & blasts. Tear up.

9/21/15.

#44 - 4 minute recorder.

Brass head, Knife Edge Pattern - 1 1/4" diameter.

Diaphragm of Japanese Paper .001". Given coat of shellac, inside & outside. Mica Disc .003" x 1 9/16" shellacked to outside & ~~Dorato~~ shellac over diaphragm & disc.

Regular aluminum arm and .008" sapphire.

9/29/15.

Made up recorders #50 & #58 and tested out. #58 split diaphragm on tightening up.

Tested out the following recorders with Mr. Dawson:

#67 - Quite full & barrely. Piano good and full.

#52 - Sharper & cleaner & stands out. Natural.

#50 - Triffle fuller than #52 but loud - clear & stands out. Good.

#55 - Weaker than 52 or 55 but natural and holds. Little muffled.

#69 - Fuller than 55. Full and too barrely.

#58 - Full and natural. Some surface. Holds well.

Then tested out #67 and #69 recorders without and with blinders:

9/22/15

#67 - With Blinders:
Full & barrely. Lines ⊙⊙ sounds

#67 - Without Blinders:
not so full - much better.
Truer - Cleaner -

#69 - With Blinders
Full but better than 67

#69 - Without Blinders
Thinner and not ⊙⊙good.

From this it seems evident that the blinders improve a sharper thinner recorder and injure a recorder already full.
We have to try further to find the value of the blinders.

9/23/15.

Men in room to change windows. No work on recorders.

Outlined parts of factory for demonstrators to see with Finlayson.

With Demonstrators in afternoon.

9/24/15 -

With Demonstrators all day.

Asked Mrs Dingrund in afternoon to make independent test of effects of blinders.

She reports
"With blinders - more sensitive and a little muffled"
"Without blinders - more natural outstanding and clear"

Comparison Readers
58 and 69

#58 - Deep quality. Round. Full. Rich.
#69 - More musical, Ringing quality, full, [illegible], [illegible] tone, [illegible] surface than 68.

Comparison of Readers
67 with 52.

#52 - Clear, sharp, distinct
#67 - Smoother, fuller, better surface

(045)

Test Recorder #69 with blinders.

① Blinders Close. Very big face, smooth, about as loud as without a shade covered.

② 6" Away - Smooth - Medium between 1 & 3

③ ~~without~~ = Rough

9/25/10

Examination of Demonstrations.

9/27/15.

Finished grading papers.
Wrote up report.
Quartette came in afternoon:
All records at first were
poor - thin - hardly - muffled.
Afterwards opened up windows
and when temperature of the
room was reduced, records
became much better.
Tried out recorders 52-59-57-
51-50. Used 50 for most
work.
Tried with & without
bilinbyes. With blinders, bigger
and fuller than without.
Without, thinner than with.

9/28/15.

In New York all day.
Making up material for
Brooklyn Navy Yard experiment
at night.

9/09/15.

Made up records #50 after Mr. Edisons directions.

Listened to record of Mrs. Tebbetts. Is too loud and full for good recording.

We'll have to be careful in future and get records not so loud & better quality or not sacrifice quality for loudness.

In discussion with Dawson and Hayes brought out that our quartette sing songs too loud. Not do they "holler" it out for effect whereas they should sing more softly and put the expression in it.

#51 Preliminary test.

Vocals mud but not as loud as 50 and is a trifle sharper.

9/29/15.

#51 - 1 minute recorder.

Brass Head - Knife edge pattern - 1¼" diameter.

Diaphragm of Japanese paper - 1 coat shellac each inside and outside. Cone of Cork 1 9/16" x ⅛" shellacked to outside and whole given 2 coats of shellac and cone and diaphragm.

Special arm of .004" aluminum sheet and .023" wire. No foot but waxed direct to cone. Regular .008" sapphire.

Made following tests of
megaphones
Mr. Dawson - 10"
#50 - Big. full - loud - natural -
clear - distinct. Piano
clear.

" Natural - diction clear, surface good
outstanding, loud. (Inspired)
" Sharp - hard - open - piano good (Dawson)

#57 - Further back in horn. Not
as loud. Clear. natural.
Tinkle sharper. Piano natural
but not as loud & further
back.

"Little more quiet than 50" - not as
loud as 50 Other characteristics about same
Richer - more mellow, resonant (Dawson)

#57 WITH BLINDERS. Piano and voice
louder, fuller & more natural.

"Seems to add more resonance"
Louder - Sharper - (Dawson)

With Miss Dunpund

#51 - With Blinders. Little weak & back in horn - Natural. Clear. Even.

#57 - Without Blinders. Apparently as loud. Little clearer than with blinders. Piano thin & costa plunky.

#50 - Big - full - Loud. Strong out.

Test of Mr. Edisons Horn.
Mr. Dawson.

① #54 - Voice - musical. clear.
clear. Piano clear. Trifle
nasal.

#54 - With Horn at 7½".
Voice - Horny - nasal. Rock
Buried. Unnatural. Sounds
like sung through horn.

#54 - With horn at 10".
Voice - only trifle louder than
① but nasal & horny.

Test of Mr. [illegible] Voice
Meso Inquiend.

#54 - Natural. Average Loud. Clear.

#52 With Horn, Nose uncovered.
Unnatural. Horny. Nasal
awful. Loud.

#54 - With Horn. Nose Compressed.
as before but little better
diction.

#54 - With horn. Sighs on face.
Not quite so bad as above.
Diction better but still had
horn quality.

Test with Blinders
Mr Dawson -

① #54 - 10" - full voice
Stands out. Big - Hollow - rather hard
Dawson

② #54 - 6" - softer voice.
Bigger & fuller but more
blown. Harder more metallic
Dawson

③ #54 - 10" with blinders -
not quite as loud as ②
but fuller than ①. softer - more
mellow - more
color - richer

Small & Long Horn
#54 - with small horn #
Louder & stands out more
than long horn below

#54 - with long horn #1 -
thinner & better definition than
above - not quite as loud -

Sept 30 - 1915

Made up reorder #59.

Spent morning with Simpson on reproduced question.

The greatest trouble Simpson has is division of authority. That he has not the purchase and inspection of his raw material and all stages of his product.

In general, he seems must have gone into the subject pretty thoroughly

He has gotten up some very exact gauges for links and for drilling buttons.

Not as loud as 58 but louder than 51. Duration not as good as 58.

9/30/15 -

#59 - 1 minute reader.

Brass Head - Domed Top
Knife Edge pattern - 1 1/4" diam -

Diaphragm of Japanese Paper
1 heavy coat shellac each
inside and out.
Cork cone 1/16" x 3/32" shellacked
~~to~~ outside and ~~coat of~~
shellac over cone and
diaphragm.

Special arm of .001"
aluminum over .011"
wire. - no foot. waxed
direct to cone. Regular
.008" sapphire.

10/1/15

I involved up reader #65 and tested out 65-58-57-57.

65 is hard load, clear, excellent diction.

58 is triple low load - fade more inclined to squeak - little too clear

#57 - Not quite so hard, diction not as good

#57 - Still too hard, clear, diction not as good as 65.

#65. Loud. Stands out. clear, clear, good diction any natural.

10/1/15

#65 - 1 minute recorder.

Brass Head. Knife Edge Pattern. 1¼" diameter.

Diaphragm [illegible] Paper grain two coats of shellac .003" thick [illegible]. Cork cone 1 7/32 × 3/4" shellacked to diaphragm [illegible] coats shellac over diaphragm and cone.

Special arm of .001" aluminum over .010" wire, short test. Regular .005" sapphire.

10/1/15.

Comparison R 58 & OL

Lawson

#58 - Full - soft - good surface clean. Holds well. Natural. Not as big as OL. Springs on full opts.

#6H - Louder than 58 - Better diction Stands out better - Big - natural fine. Little decorative & inclined to fringe

#65 - Sharper & harsh - weaker - little horn tone.

10/2/15.

Made up recorder #64 and tested out. This recorder is very, full, sensative, loud, natural. Should make good one for talking pictures.

Borrowed #9 Recorder from Geo. Werner and tested with stretched recorders. The stretched recorders have all qualities. louder - not so loud - sharper fuller - clearer - more muffled I do not see why we can not produce a stretched recorder to match any given recorder.

Miss Ingrund came in the afternoon. Made the following tests on recorders:

① #65 - Stands out. Little sharp. but natural for musical voice. Quiet. Good surface

#64 - More natural. Louder. Stands out. Fuller. Good piano. good sounding.

#58 Fuller than 65. About same as 64. Not as loud as 64 or outstanding. Holds well.

Duet. Mood. mid. - Blinders

#9B Little weak but very natural and holds fine. Duet - soft - musical.

#58B Stands out better - Louder - more open - not as musical and sweet.

#64B Cleaner and more natural than #58. Fuller and more muffled than #9.

Duet - Same - No Blinders

#9 - Trifle back in Horn. Natural. Holds well. Trifle louder than 54.

#54 - Not quite as loud as #9. Cleaner - less muffled. Natural

C813

Duet - Test of Blinders.

#9 - 3 Blinders.
Bigger - fuller than without blinders.

#9 - 1 Blinder.
not as big or full as above but little clearer & less horn tone.

#9 - without Blinders -
weaker, thinner & sharper than above

Solo - Mr. D.

#9 - Full - natural - good definition.
#67 - Fuller - bigger - coarser tone - not so good definition
#69 - Full - little muffled? horn tone - natural

Piano Experiment
2 Horns close.

#9 - Natural but little fringe or surface rattle.
#64 - Louder - more ring - more natural.

Piano Experiment with
blinders & side pieces
#50 - Full & inclined to blast.
without blinders
#50 - thinner but cleaner & clearer.
Pretty good piano record.

Farther away without Blinders.
#50 Clear - clear - pretty good
piano except not much
ring.
#50 - WITH BLINDERS.
More ring & bigger, fuller &
quieter & more musical.
Ring dies away slower.
#65 - WITH BLINDERS
Does not stand out as 50.
Sounds lost in comparison.
Only fair ring.
#65 - WITHOUT BLINDERS.
Little cleaner & sharper. Not
quite so much ring.

Piano-Exp. 1 horn.

#6H. Beg but trifle barrely & not as good as with 2 horns back.

#9 - not as beg and bond as 6H.

Big - loud - stands out.
full - natural - clean.
Seems better than 90 on
voice.

10/1/15.

#6H - 4 minute Recorder.

Brass Head - Domed Top -
Knife Edge Pattern - 1¼" diam.

Diaphragm of Japanese
paper shellacked on both
sides. Domed cork cone
turned to fit dome 1⅛"
x ⅛" - edge thin shellacked
to diaphragm and 2
coats shellac over
cork and diaphragm.

Regular aluminum arm
and .008" saphire.

10/2/15.

In New York with Dahlgren, installing Kinetophone at Grand Central Palace.

C96J

10/4/15.

Began on Report.

Listened to records with stages.

Laid out for Taylor Road Sidewalk Fencing. Phonograph for Chas. Edison.

Miss Rensen, Mr. Fates, Miss Ingrund & Apple came in afternoon.

On account absence of Mr. Beyle Rigoletto Quartette could not be done.

Made following trials -
Miss Rensen -
T 73° - 12' from horn - R5H -

#5H - Voice medium loud - trifle sharp - surface good - holds well - Rund thin

#6H - Piano bigger and fuller - also voice - holds better than above -

#65 - Piano bigger than 54 - more natural & fuller on voice, holds up well - soft - musical

#9 - Cleaner than 65. Stands out well - piano good & full -

Quartette of

Applegate	10"
Miss Yates	8"
Mrs Renson	13"
Dawson	7"

#9 - Somewhat muffled not clear diction not good.

#54 - About same loudness but sharper than #9 cleaner.

Put each of the singers up on each

#9 - Quite back and muffled.

#64 - Clearer - clearer - louder - more natural - stands out.

10/6/15.

Finishing up report.

Inspecting Kinetophone Film & Records of "Birth of the Telephone"

Laying out Chas Edisons Land Phonograph.

In New York inspecting work on Kinetophone Installing for Western Electric Co.

- DAWSON'S -- SUGGESTIONS -

C473

10/6/15.

Finished up report.

With Taylor on Charlidsons loud Disc machine.

Discussing with Dawson his recording schemes. These are good and while in some cases novel are reasonable.
Based on these want to try the following experiments:

1. See effect of singing against side of horn flapping up the mouth.
2. Make device for recording by longitudinal vibrations of of rod.
3. Try sectional horn to confine or round out voice but thin out to prevent being too loud. Also one with cloth over head to confine & use all tones.
4. Try sound on horn to show resonance

(5) Try piano recording with several horns of different sizes.

Miss Buchbinder and Miss Miss Dingwall came in afternoon. Tried out recorders with Miss B. Also worked Miss B out on recording trying to show her what to guard against.

· Made following recorder tests:

#67 - (N.Y. Studio ~~Standard~~) Standard.

#54 - not as clear and clear as Std. Truth fuller, natural.

#52 - Diction not as good as 67 Little sharper.

#9 - Fuller more mellow than Std. musical. not as sharp Cylinder #2.

#68 - not loud as Std. Back in horn. Clean.

#Std. Standard

#58 Full. not as loud as Std. not as clear r. clear. Diction not as good.

#9 - Rich - full - natural - does not ~~stand out~~ as Std but not badly back in horn.

#54 - Very close to standard. About as loud. Clean & natural.

- Cylinder #3 -

Std. Standard

#9 - More even & natural than Standard - Holds better. Tripler fuller.

#54 - Diction good. Holds better than standard. Rather mealy - Rechon good.

On These reasons I picked Std. as best - 4 picked 9 & 1 " 54.

Cylinder #4 -

#67 - Standard -

#64 - Not as loud. Holds better - not as even ring throughout register.

#9 - Firm, even, little interference not as clear as 64 -

#58 - Full. Holds well. Scales good even mealy tone

#57 - Cleaner - loud holds well chords better than 58 but not so keg & full & natural -

Cylinder #5
Duet

#59 - Clean - clear. Hoeds.
#59A. Louder - shows interference.
Stands out better, more
natural -

#64 - Good - natural - hoeds.

Best balance on Duets
Miss B - 8"
Mr. D - 12"
Temperature 72°

10/7/1[illegible]

Piano Test of Reasoners

T 72°

Cylinder #1

① - 9 - Full. Natural. Holds. Surface good. Ring fair.

② - Std. Loud. Fuller. More natural and more ring. Surface good. Ring fine. Fringed.

③ - 52 - As loud or louder than Std. does not hold as well. Fuller. more natural. Slight fringes. Ring excellent. Surface excellent

④ - 64 - Big. full. Excellent ring. Excellent surface. Very natural. Holds better than 52 & does not fringe.

⑤ - 50 - Big, full. Fine ring, surface good. Holds better than 52 but not as well as 64

⑥ - 68 - Not as loud or as much ring as 52-64 or 50 - little plunky. Rufe surface - Holds well.

⑦ - 58 - Bigger & louder than 68 but not as much as 50 - more woody Tone. Little surface & Plunky (1[illegible])

10/7/15

Cylinder #2

① - 58 - Back in horn. Surface fair. Fair ring only. Sounds little plunky.

② - 68 - Weaker & back. Surface shows. Holds. Fair ring.

③ - 50 - Big. full. Loud. Holds this time. Rings. Surface good.

④ - 64 - Not quite as big as 50 but still natural. Holds better than 50. Surface good.

⑤ - 52 - Big. full - but gives strained sound to string. Surface good.

⑥ - Std. Does not stand out as much Holds. Sounds more covered but full and natural.

⑨ - 9 Holds fine. Covered. Not as clear as 50 - 64 or 52. Natural. Surface good.

10/7/15

Cylinder #3
Spring Song Piano.
Regular Set up
RGH - and Standard - Standard is better. May not be so clean but is bigger and more natural and holds the heavy notes

Cylinder #4
Spring Song - Piano.
Same as above except screen put behind piano.
R - Std - 00. Standard is more covered but richer & more more mellow.

Tests of Mr. Edisons Experimental Horn.
① Regular Recording
② With Experimental Horn.

This horn responds naturally to F. and with recording seems to respond to other notes.
It is not as loud as regular #7 horn and requires singing closer in.

10/7/15.

Gives pronounced horn tones and by responding to certain notes is not even.

Test of Mr. Edison's Megaphone Horn.

Miss Sangpund sang in #7 horn without and then with megaphone horn. Beard showed that this horn did not increase volume but did improve the diction in the case of Miss Sangpund by bringing out the head and nasal tones.

10/7/15.

Finished up Chas. Edison's loud Diamond Disc Machine.

Made up recorder #68. First diaphragm broke. Second O.K. This recorder is weak and tinfer thin.

Miss Dingrund came in afternoon.

Tested recorders as per previous pages

10/7/15

#68 - 4 min recorder.

Brass Head. Knife Edge Pattern. 1 1/4" diameter.

Diaphragm of japanese paper 3 coats shellac - ~~about .001"~~

1 13/32 x 1/4 Cork cone, turned ~~x~~ fit domes, ~~little thick on edges, extend to outside with shellac and~~ cone and diaphragm given coat of shellac.

Regular aluminum arm ~~also .008" sapphire.~~

Rather weak. Back in horn.
Heads well. Trifle thin.

10/8/15

Test Recordings:

Std. - Very loud. Full. Big. Sensitive
Hobbs. Action good.

55 (new) - Not as loud. Trifle sharper.
Hobbs better. Natural.

9 - Little louder. "Mealy". Little
fuller than 55. Natural - Little
back in horn.

58 - Little tiring. Not as firm,
natural. Little fuller than 55.

10/8/15

Quartette Recording

T 74°

#9 - Singing not as loud as before.
Showed more expression -
smoother - more dramatic
than we have done in some time.

A 10
F 9
R 14
N 4

#55 - All closer up -
A - 9
F - 8
R - 12
N - 3

Still not quite loud enough -
Smoother & more sugar than
before - Balance fair.

C12J

10/8/5

Tried out Records #54 without Blinders and again with blinders on quartette singing Soldiers Chorus from Faust.

With blinders the effect is pronounced - bigger, louder fuller and at the same time cleaner.

Tried same with records #50 but this does not lead as well as 54 - is muddier. #54 is nearly as loud and is cleaner and clearer & more distinct.

Quartette did good work this afternoon. Sang with a great deal more expression - put intelligence and energy into it.

Preliminary Trial. Halos well natural. Triple sharper than #9 & not as medly.

Tried out on Quartette 10/6/15 - not as loud or stand out as well as #9. Very clean & good surface but triple weak and back in horn.

10/8/15

#55 - 4 minute recorder.

Brass Head. Domed Cap... Knife Edge pattern - 1¼" diam.

Diaphragm of Japanese paper given two coats shellac. Cork cone 17/32" x ⅛" turned to fit dome and shellacked to inside of diaphragm. Cone and diaphragm given coat shellack all over.

Regular aluminum arm and .008" sapphire.

10/9/15

Worked on Dawson's longitudinal vibration recorder and made preliminary test. Very weak - too much for use.

[125]

10/11/15.

Wrote up report.
Saw Nehr and Werner about getting Kinetophone record on Desk for Chas Edison.

Experiment with Mr. Dawson on stopping end of horn and singing through metal of horn.
Proved that this could be done - Piano fairly natural. Voice as if at end of big room.

Sang and played into various horns and tried to find to which notes they responded.
Tried two of them singing with piano to see if they would record this note on cylinders. They did not.

Test of Horns -
#7 Standard -
#6 - Trifle fuller but close.
Little difference.
#12 - Little fuller than #7 - Piano does

not come out as loud - sounds
lost.
#L1 - Louder than L2 Bigger.
Piano - louder & cleaner.
about same as #7.
#4 - Not as loud as L1, ~~not~~ as
big. Full.
#6 Larger - Louder than 4, clear
full good cleaner.

Mr. Dawsons comments
#7. Stands out Well. Good
quality.
#6 (Smaller) Not as clear as #7
Otherwise little difference
#2 Long. Fuller than both 6 + 7
Not as clear as 6
#1 Long Very much like #2 Long
Only more so
#4 short - Little muffled but
good quality.
#6 Big Dull but quality
otherwise good.

10/12/15.

Experiment with Dawsons Auxiliary Horn.

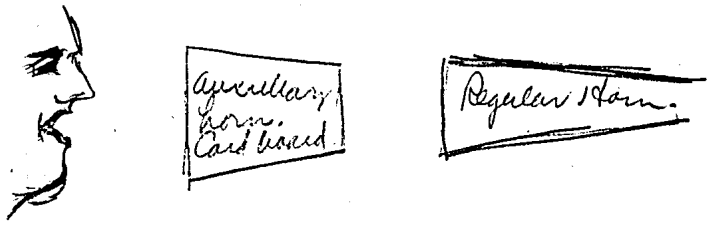
T72° R5H #7 Horn - 9"

(1) Regular. Used as Standard.

(2) With auxiliary horn. Louder but shows "squaks" or loud spots. Not as even and solid as without.

This horn was 7" diam to 9" diam x 10" long.

Then tried with smaller auxiliary horn. Made record sharper and "squeakier".



Made up recorder #70. Very full & natural but weak & backin horn.

[131]

Preliminary Test =
Weak, soft, back in horn but very full in tone and very natural especially piano.

"Not as loud as #9. soft, full, rich mellow, sweet & musical. Piano sounds well"

10/12/15

#70 - 1 min recorder.

Brass Head - Knife edge pattern. 1 1/4" diameter.

Diaphragm of Jap Paper 2 thin coats shellac - Cork cone 1 3/16" x 1/16" shellacked to outside and coat of shellac given cork and diaphragm. (notice that diaphragm has only little movement inward before striking head; proving that shellac on surface is showing cork inward)

Regular aluminum arm and .008" sapphire.

Triple louder, more brilliant and sharper than 70, Rather harder Tone. Piano good. Definition excellent.

10/12/15.

#71 - 4 minute recorder.

Brass Head - Knife edge pattern - 1 1/4" diameter.

Diaphragm of Jap. Paper 2 Thin coats Shellac. Cork cone 1 1/8" x 3/32" shellacked to outside and 2 coats of Shellac over cone and diaphragm.

Regular aluminum arm and .008" sapphire.

10/13/15.

Made up recorders 72 and 73.

Got ready for 2 minute record of MPA for San Francisco Exposition.

Saw about film for Warner.

Made record of MPA for San Francisco.

Quartette came in afternoon Mr. Strickett as new tenor. After trials made records of Rigoletto Quartette without and with blinders and masters for same.

The effect of the blinders is to make records bigger and fuller but, curiously, to cut down tendency to be irregular in opera. Record without blinders however is sharper and cleaner and apparently stands out more than with.

#72 Little weaker & fuller than #71 but inclined to be metallic. Same horn tone.

" Lower than #71 - clear - good diction - clear - quiet - standout.

10/13/15.

#72 - 1 min recorder.

Brass Head - Knife Edge pattern - 1¼" diameter.

Diaphragm of Japanese Paper, 9 coats shellac. Cork cone 1⅛" × 1/16" shellacked on outside and cone and diaphragm given two coats shellac.

Regular aluminum arm and .008" sapphire.

#73 Very close to #9 - about as loud and full but not quite as firm

Not as loud and clear as 72. More muffled & buried. Not as clean. Soft & melodious, more mealy. Stacks fine.

10/13/15.

#73 - 4 min. recorder.

Brass Head - Knife Edge pattern. - 1¼" diameter.

Diaphragm of Jap. Paper given 2 coats shellac. Cork Cone 1 3/16" x 1/16" - shellacked to outside and cone and diaphragm given 2 coats shellac.

Regular aluminum arm and .008" sapphire.

C1413

10/18/15.

Mr. Strakelli's voice blends well with others. He mouths his words somewhat too much for solo work but in straight quartette is good.

Tried out 2 minute recorders #56 & 61 against 74 on 2 min records for M.P.T. #61 better than #56. Both louder and sharper than 74 which is more mealy. These recorders have stood up fine though some 5 or 6 months

---

10/14/15

With Demonstrators all day.

10/15/15
With Demonstrators all Day.

10/16/15

Examining Demonstrators.

Solutions regarding plant for Telephone Transmission.

10/17/15.

Hutchison's Record for
Telephonic Transmission.

[15]

10/18/15.

Correcting Examinations.

Repairing Recorders.

Preparing for Substations.
~~telephone transmission plant.~~

10/19/15.

With Mr. Dawson tested the following recorders:

#9 Used as Standard. Good - Full. Natural - Sweet.

#70 - Not quite as loud. Soft, full, rich, mellow, sweet & musical. Piano sounds well.

#71 - Trifle louder, more brilliant and sharper than #70. Little harder tone. Piano good. Definition excellent.

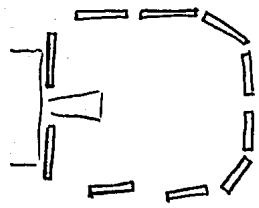
#72 - Little richer and fuller than 71 but more inclined to be metallic. Some horn tone.

#73 - Very close to #9 - about as loud and full but not quite as firm perhaps.

#54 - Louder than #9 and stands out better. Trifle sharper and more metallic. Shows trifle more horn tone.

Test of Cow Hair against Reflecting Screens.

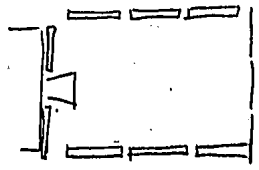
#54 with cow hair screens around



= cocoa hair screen to deaden sound

= Beaver Board screen to reflect sound

① As above, used as standard



② As above.
Treble more even & level in tone and more natural.

Dawson says
"With reflecting screens, tone seems freer - not as restrained but tinkling, while more brilliant is not quite as rich".

Test with Kellex Helmet

① without R54 as standard

② with Helmet. 1st test little farther away. Not quite as loud, softer, richer, bigger fuller tones, but lacked the brilliancy & crispness & distinctness of without.

2nd test both 10". With was louder & fuller and had some barrely tone.

Will full out records probably as Blenders do when used at correct distance.

Test of Recorders to repair or tear up.

#9 - Used as Standard.

#50 - Big, gr. - louder - Fuller more piano. Horn tone shown. Does not hold as well.

#51 - Very weak & back. Trifle sharp in lack of overtones -

#65 - Loud enough, rich, holds well
tripe back in horn. Slight
metallic. Slightly harsh.

#59 - Not as loud. Holds well.
musical & mealy. Slight horn
tone. Lacks brilliance

#58 - Loud - full - stands out -
some surface. Slight horn
tone. natural - Cold ~~or~~ hard

#44 - Loud - Big - Full - Rich
metallic - Horn tone - Sensation
beasty tendency.

? #60 - Loud - Full - Rich - Holds
well - not brilliant - only
slight horn tone.

? #67 - Loud - big - full, tripe more
full than above. Slight
horn tone. Piano fine

#55 - Weaker & back in horn.
thinner, Holds well. no
horn tone.

#64- Fairly loud. Full- natural. Holds well - Slight Horn tone tendency.

✓ #52- Loud - Little sharper. Piano loud & sharper. Clean. Holds. Little metallic.

✓ #57- Loud - mellow- full - clean holds well. no horn tone.

Same with Piano

#9 - Used as Standard. Holds well - Tones natural. Good ring.

#50 - Loud-big full but holds, Big ring. Natural.

#51- Not as loud. Full & natural. Holds everything. Too soft.

#65- Little louder than 51. Full very soft & musical

#59- Natural. Fairly loud. Holds musical.

#58- Loud - Full - Holds well - Big tone - Best yet.

#44 - Loud Big - full - little rattle. Very natural on easy stuff -

#60 - Fairly loud but not as loud as 44. Shows little blast. natural on soft parts.

#67 - Loud. Holds Starts out. Slight blast.

#55 - Sharper. Not so big & full & natural -

#57 - Loud - full - natural - holds well. Good ring. Holds -

#52 - Big - full but little rattle

#64 - Natural - Big - full.

Tests of Recorders with Mrs Buchbinder.

#9 - Piano - natural. Voice little back. Clean, natural. Full. Holds well.

#70 - Quiet, not quite as loud as #9 Surface fine. Fine diction not as brilliant or as much life, trifle uneven from moving back & forth.
Compares well with #9.

#71 - Piano does not stand out as well. Voice sounds more buried than either of former. Natural but not as good diction.

✓ #72 - Louder. Clear. Good diction Clean, quiet. stands out.

✓ #73 - Not as loud and clear as 72 more muffled and buried. Not as clean. Soft & melodious more mealy. Holds fine.

#54 - Big & fuller than any of the above, louder than above.

Test with & without Helmet.

① Without. Cleaner - clearer

② With Helmet Muffled.

Duet Mrs. B & Mr D.

① Without Helmet - Cleaner & Clearer

② With Helmet - Not as clear & clean

Experiment Cow-Hair
Screens against Reflector

(1) With Cow-Hair Screens Standard.

(2) With Reflecting Screens. Shows little louder fuller piano. Voices all louder & more natural.

(3) With Small Blinders. Triffle fuller but not as clear & clear. Shows 00 Tones in 2 places.

(4) With Large Blinders. Not as loud but separates voices excellently

Quartette Best With
Large Blinders

Used Miss Bushbinder, Miss Ingrund
Hayes & Dawson with 40 x 40
Beaux Board Blinders.
This record was not loud but gave the finest quartette I ever heard on the Phonograph. Absolutely no interference. Everything clean.

10/20/15

Piano Test with and without Reflectors.

① With 4º x 4º Beaver Board Reflector -
Too loud. Shows interference and blast but good long ring.

② Without. Not so loud. No blast but, more of the "plunky" effect, lacks ring.

Piano moved back to greater distance

① With reflector
Shows a metallic rattle & interference -

② Without reflector - weaker & plunky -

Same with Cow Hair Screens behind in place of Beaver Board

With reflector shows more ring than without.

Cow Hair Screens. Working at Standard Distance & Set.

Slightly louder than before. With Reflector shows more ring and better than without.

As above but with horn raised. Reflector raised so as to give nearly reflect in horn.

With reflector best yet. More natural & true & better ring than without

---

With Large Reflector above piano.

Not as good as with smaller reflector above, though with reflector was better than without. This may be because of the concave effect of the smaller reflector.

With Small Reflector, piano parallel with horn.

Louder than with piano in usual position - Reflector shows comparatively very loud - Reflector was put in position to reflect maximum waves.

Same with Reflector more nearly vertical.

Good, not too loud & blasty, true tone. Reflector shows advantage in ring.

Same with Piano Sideways

Shows muddy & with interference Better here without reflector

---

Piano Experiment
Horseshoe Crab Horn
12" from piano connected
to machine by 4º rubber
tubing.

1st part of record, Moszkowski
Serenade. Fine. Full & natural
2nd part Rachmaninoff's Prelude –
Blasts throughout.

Same as above but 2nd part
horn raised to 24".

Little or no apparent difference

Part 2 of above with horn
3'-6" from Piano.
Does not show jump outs but
does show bad interference &
unpleasant

Same. Horn connected to
piano with 16" tubing. 12"
from Piano

Comparison H.S. Horn @ 12" & 18".
12" louder & fuller. 18" little more plunky.

As above with H.S. Horn at 18 without & with reflector.
The reflector, seems to make softer, more mellow and even.

As above with H.S. horn at 12". Without & with reflector.
The reflector seems to make the tone more mellow & not so clear & distinct.

NOTE —
Things Learned

① Use of large beaver board blinders gives quartette records without interference
② Long rubber tube between horn and machine increases fullness and tendency to blast
③ Records can be made through rubber tube
④ That the beaver board screens

Recorder #74 - min.

Outside Diameter	1 3/8"
Diameter Diaphragm	15/16"
Thickness Diaphragm	.0015"
Material Diaphragm	Mica.
Internal Diameter Mica	3/4"
Diameter Aluminum Disc	15/16"
Thickness " "	.006"

Regular arm shellacked to aluminum and to edge of mica.

Recorder #10 - 1 min.

Outside Diameter Head 2"

Diameter Diaphragm 1½"

Thickness Diaphragm .00175"

Material Diaphragm Acetyl Cellulose - 50% camph. (?)

Aluminum Disc, flat, waxed to center of diaphragm 15/16" x .0065"

Regular arm waxed center & end.

Needle .008".

Diaphragm stretched by cooling.

#50 Too sensative
Tighten Diaphragm ①
add Buffer or wax ②

#51 - Too weak - Make own.

#65 - Back in horn or barrelly.
Try tightening..

#59 - Dull & lacks brilliance.
Tighten.

#58 - Hard or Cold tone. Not rich.
Surface.
Flatten sapphire

#41 - Sensative. Tendency to blast
Put on wax or cork buffer.

#60 - Fair. Hold for further test

#67 - Fair - Hold for further test

behind the piano gave rattles,
& interference which were eliminated
by cow horn screens behind.

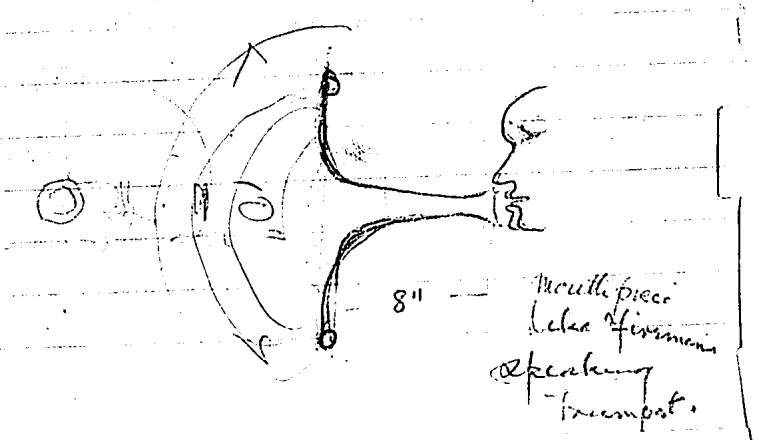
[ITEM(S) FOUND IN BOOK]

Kennedy

make (1)

Corrugated to stiffen

Tin - heavy gauge



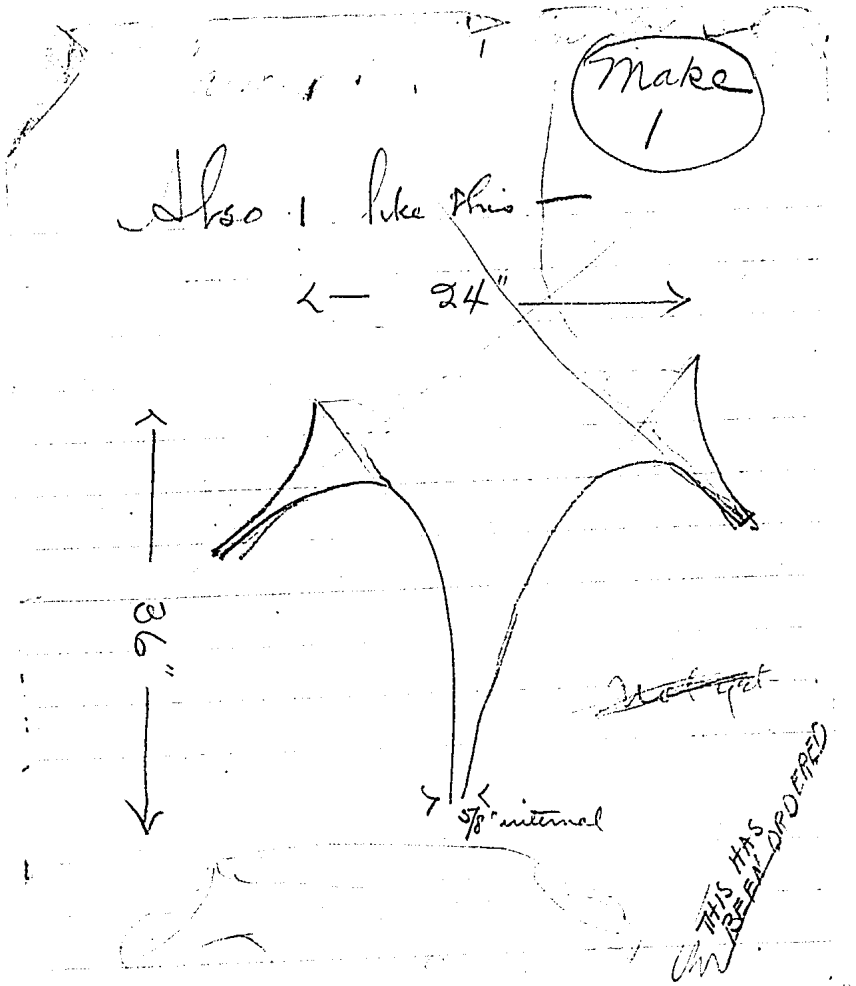
Make one = Have singer

Sing without a then succeede front phone funnel 8" the length of horn & sing again same volume

[ITEM(S) FOUND IN BOOK]

Make 1

Also I like this —



~~Must get~~

THIS HAS BEEN ORDERED

Get 15 feet of the flexible metallic tubing used for steam-without bends

1 1/2 inch inside measure strong will take 4 men to get it

[ITEM(S) FOUND IN BOOK]

Singing against side of
(1) horn. Stop mouth

(2) ~~Tassie~~ Steel Diaphragm
to Steel Rod + record
in this way

(3) Tuture board
head horn

(4) Try sand on horn
to determine resonance

(5) Piano recording with
Bernal horns of different
shapes & sizes.

[ITEM(S) FOUND IN BOOK]

① Resonance to singer means overtones + not the ability of one body to impress its vibrations upon another sonorous body which is in sympathy with it.

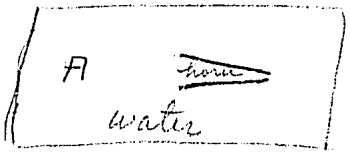
Horny sound in records may be caused by horn vibrating. Try deadening the horn by touching at edge and half way between. Sound should go direct from singer to recorder with any interfering vibrations between.

Could vibrations be transmitted to recorder by metalic means instead of air currents. Try singing against side of horn. Might have large metal diaphram constructed similarly to recorder and connected with it by a thin steel rod instead of a horn as at present. Object being to eliminate horny sound.

Is there any material difference between sound waves and water waves. There being practically no way to tell how sound waves act in the interval

[ITEM(S) FOUND IN BOOK]

between leaving singer and entering recorder, it might be possible to put two blinders in water thus



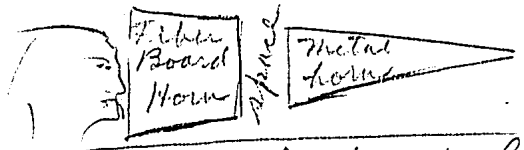
or half submerge a horn and after allowing water to become perfectly still, drop object in water about A and watch action of waves entering horn etc.

Sound waves should be caught directly they leave the singer and rounded. However it has been shown the recorder will not stand full force of all the vibrations such as would be obtained by singing directly into the mouth of the horn. Therefore why not have segment of fiber board horn size & position of which would be continuation of metal horn, which would catch sound as it leaves the singer but with a space

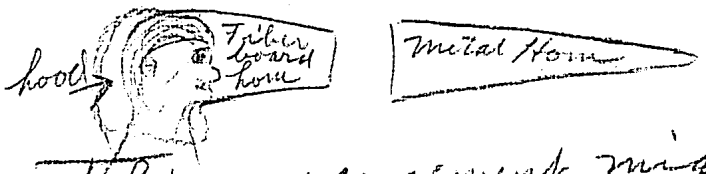
[ITEM(S) FOUND IN BOOK]

(7)

intervening between the two to allow excess vibrations which are not wanted to escape. ~~If~~ this;



Or possibly instead of F.B. horn suspended as above, have a horn which would fit over the face of singer fastened to his head and with cloth attached that would come down over his head like a hood. Thus all tone waves would be caught and rounded before going into horn



This arrangement might succeed in getting more nasal overtones into recorder without the brassy nasal sound the fireman's horn produced

[ITEM(S) FOUND IN BOOK]

Horns has a definate pitch as may be seen by striking it. Certain tones will cause it to vibrate in sympathy. These tones would produce more resonance (physical) than other tones and consequently project waves with greater force into recorder. Can that be the cause of blasts and the bad sounds produced by certain chords on the piano?

Ideal horn would be one of great plasticity and a super-human brain, that could anticipate each tone that is to be precipitated into it and and adjust itself into such size and shape that would be suitable therefor.

Could sand be used in any way to determine when horn is in sympathy with the tone and when not.

What is a soap film

[ITEM(S) FOUND IN BOOK]

(3) Violins all have their particular pitch C_3 but by much experimenting it has been made almost imperceptable and in playing a scale is not noticable. Horns and recorders must have theirs too & theirs must also be made imperceptable Are they now? Might not this cause the bad sounds noticable on certain chords of piano. Or might not the fault lie in the present construction of the piano not noticable to our ear but affective on the recorder

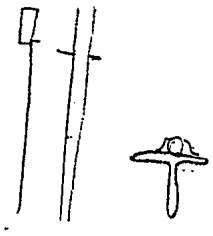
Our ear passage also has its pitch and some notes seems more cutting to us in consequence than others

Something of this sort is very noticable in piano records. Friday I noticed the upper and lower registers were much clearer and penetrating than the middle register. Possibly the horns used were in sympathy with these registers. Perhaps a horn of different shape and size would be sympathetic with the middle register. Maybe the trouble could be helped by using several horns of different shapes and sizes.

[ITEM(S) FOUND IN BOOK]

(1) Natural - little back on horn. Holds fine diction good.

55 (2) - not as loud - Triple sharper - holds fine natural - back

9 ✓✓ (3) - Triple louder than 2 - Fuller than 2 - natural - back on horn

54 (4) - Better tuning. Natural - not as fuzzy